FOR CAL + Service
Rothe Development Inc.
SAN ANTONIO, TEXAS 78222
SWRI 03
4614 SINCLAIR RD.
(512) 648-313

HIPOTRONICS, INC.

MODEL NO. HM3AS
PART NO. CS1669

Hipotronics inc.

applied high voltage technology for industry utilities & science

MP MASTER
MA35489

HIPOTRONICS, INC.

MODEL NO. HM3AS
PART NO. CS1669

DANGER HIGH VOLTAGE

GROUND CASE BEFORE CONNECTING INPUT POWER

DISCONNECT INPUT BEFORE UNGROUNDING CASE

MEGOHMMETER
MODEL HM3AS
PART NO. 16-69

DESCRIPTION

Model No. HM3AS Megommeter is a direct reading resistance measuring instrument. It indicates directly on the front panel meter resistances from .1 to 20.000,000 megohms. This range makes the Model HM3AS capable of measuring leakage resistance of most types of electronic insulation and components. The voltages applied to the unknown can be selected by a switch on the front panel and range from 50 volts to 1000 volts in four steps.

CAUTION

When the lever switches are depressed, regulated high voltage is applied to the output terminals of the megohmmeter, as indicated by the voltage selector switch on the front panel. Although the current is limited to a non-lethal value, the energy stored in a capacitor connected to the output terminals may be lethal. Therefore, ALWAYS RELEASE THE LEVER SWITCHES BEFORE CONNECTING OR DISCONNECTING THE UNKNOWN TO OR FROM THE OUTPUT TERMINALS.

FEATURES

Regulated test volages of 50,100,500, and 1000 volts.

6 position meter multiplier switch which selects the ranges from X1 to $X10^5$ with secondary X.1 to $X10^4$.

Precision 1% internal calibration resistors and front panel position switch for full scale calibration.

Guard terminal and grounded binding post with grounding link for grounded and ungrounded operation.

Dual color scale for ease of reading at different voltage settings.

"Charge" and "Test" lever switches on front panel for maxmum operator safety.

SPECIFICATIONS

Input	110-120 volts, 60 cycles, 1 amp fuse
Range	2 megohm to 20,000,000 megohms @1000 volts 1 megohm to 10,000,000 megohms @ 500 volts .2 megohms to 2,000,000 megohms@ 100 volts .1 megohms to 1,000,000 megohms@ 50 volts
Accuracy	± 3% at low resistance end of scale on first five ranges, ±5% on highest multiplier range.
Terminals	Plus and minus for unknown, ground with grounding link and guard. All color coded.
Voltage for Terminals	50,100,500,1000 volts ± 5% can be selected by voltage selector switch on front panel.
Cabinet	Metal carrying case
Dimensions	6"D x 7"W x 12"H
Accessories	Two color-coded test leads. One 6 foot shielded cable (for remote measurements) with shield plug for guarded operation.

OPERATION

Connect the instrument to a 117 volt AC power line and turn power on. Allow a twenty minute warm-up period, then calibrate. (See Calibration)

GROUNDING LINK CONNECTIONS:

The grounding link attached to the ground post, may be connected between the grounded and white (minus) guard terminals or the grounded and red (plus) terminals. The guard terminal should be grounded if the sample to be measured can be isolated from ground. However, if one side of the unknown must be grounded, then the grounding link should be connected between the ground and the red(plus) terminal.

MEASUREMENT PROCEDURE:

If the approximate resistance of the sample to be measured is not known, proceed as follows:

A) Set the VOLTAGE SELECTOR switch to the desired testing voltage and the MULTIPLIER switch to X1.

Digitized by the Internet Archive
in 2025

https://archive.org/details/manualsplus_08386

MEASUREMENT PROCEDURE (Cont'd).

B) Connect the unknown between red and black terminals.

C) With your left hand depress the left hand lever switch marked "CHARGE". (For a capacitive leakage resistance measurement, hold the "CHARGE" switch, depress for a few seconds per microfarad.)

D) With your right hand depress the lever switch marked "TEST".

E) If the meter does not indicate a reading, release the "TEST" lever switch and rotate the multiplier switch clockwise one step at a time and depressing the"TEST" lever switch, until the meter indicates a reading, preferably on the lower portion of the scale (to the right of the center scale).

F) Read megohms off the red arc if the voltage selector switch is on red and off the black arc if on a black position.

G) The resistance of the unknown in megohms is the meter reading, multiplied by the MULTIPLIER switch indication on the corresponding arc (For 500 and 1000 volts X1 to $X10^5$ and for 50 and 100 volts X.1 to $X10^4$.)

H) After the reading has been taken, release the "TEST" lever switch first and then the "CHARGE" lever switch will automatically discharge any capacitive component connected to the measuring terminals, such as cables or capacitors.

GUARGED OPERATION

In many situations it is necessary to measure resistance between two terminals in the presence of resistance from each of these terminals to a third terminal. This third terminal can (in most situations) be guarded to avoid errors due to this extraneous resistance.

The guard terminal may be used whether the guard or the red terminal is grounded, but note that if the red terminal is grounded, the guard terminal will be at a high (negative) voltage level as indicated by the VOLTAGE selector switch. Often the terminal to be guarded is a large chassis or an uninsulated component container. Therefore, it is safer to ground the GUARD terminal. If this third terminal is a true ground, the "GUARD terminal MUST be grounded.

REMOTE MEASUREMENTS:

Using the shielded cable supplied with the megohmmeter, measurements can be made on components that are some distance away from the instrument.

REMOTE MEASUREMENTS (Cont'd)

For this operation the GUARD or the red terminals may be grounded. If one side of the unknown is grounded (or must be grounded) connect the grounding link to the red terminal. If the unknown may be measured ungrounded, connect the grounding link to the GUARD terminal. In any case, the inner conductor of the shielded cable is connected to the black terminal and the shield to the GUARD Terminal. The unknown is connected between the red and the inner conductor of the shielded cable.

CAUTION

For this operation extra care should be used to avoid shock hazards.

CALIBRATION:

A) Set "TEST VOLTAGE" switch to desired voltage and multiplier switch to X1.

B) Depress lever switch marked "TEST" on the front panel and adjust SET"H" control for "H" on the meter scale. This control should be reset with the volts switch on desired voltage setting whenever the meter does not indicate "H".

C) Set multiplier switch to "L" cal position, depress "TEST", switch and adjust SET"L" control for "L" on meter scale. Always calibrate "L" when "TEST VOLTAGE" switch is in desired voltage position.

D) Zero shift adjustment:

The zero shift (due to grid current) has been adjusted at the factory. This adjustment can be checked as follows:

Set TEST VOLTAGE SELECTOR switch to 50 volt position after calibrating "H" and "L". Now turn the multiplier switch to the highest range. Depress "TEST" switch. The pointer should remain on the "H" setting. If there is zero shift present, the procedure is as follows:

Calibrate as in a,b, and c. Set the Test Voltage selector switch to 50V. Set MULTIPLIER SWITCH to the highest range and adjust R4 (mounted on printed circuit board) through the back of the cabinet (use a non-metallic screwdriver) in a direction opposing the zero shift. Since the SET "L" and SET"H" controls interact with R4, the entire calibration procedure should be repeated several times until there is no zsro shift.

CORRESPONDENCE:

Please include part number (located on rear of unit) and Model No. in all correspondence regarding Hipotronics equipment.

HIPOTRONICS, INC.

PARTS LIST
MODEL NO. HM3AS, PART NO. 1669D

CAB	Cabinet EES E-2437
C1	Capacitor, 4 uf @ 250 VDC
C2	Capacitor, 150uf @ 3 VDC
C3	Capacitor, .01 uf @ 1 KV
P/O T-2	Capacitor, .25 uf @ 1KV
C5	Capacitor, .5 uf @ . 2 KV

Connectors,
J1 ------Superior Binding Post DF 31BC
J2 ------Superior Binding Post DF 31WTC
J3 ------Smith Binding Post 1518
J4 ------Superior Binding Post DF 31RC
P1 ------Line Cord, type 18/3SJ

CR1	Diode, IN4820
CR2,9-17	Diode, Zener, IN3044B
CR 3-6	Diode, EDI EG300
CR7,8	Diode, Zener, IN3037B
F1	Fuse, 1 amp 3 AG in Buss Holder HKP-CC
M1	Meter, Weston, 50 ua, Hipotronics scale # 1672
PL1	Pilot Light, Tineon, #3600
R1	Resistor, 22K, 1W
R2	Resistor, 27K, 1/2W
R3	Resistor, 47K, ½W
R4	Resistor, Pot, 50K, 1/4W, MTC 54L4
R5,10	Resistor, 100K, 1/2W
R6,11	Resistor, 330K, 1/2W
R7	Resistor, Pot, 10K, 2W
R8	Resistor, Pot, 250K, 2W
R9	Resistor, 1K, 1/2W
R12	Resistor, 10M, 1/2W
R13	Resistor,100M, 2W, 2%
R14	Resistor, 10M, 1W, 1%
R15	Resistor, 1M, 1/2W. 1%
R16	Resistor, 100K, 1/2W. 1%
R17	Resistor, 10K, 1/2W, 1%
R18,19	Resistor, 1K, 1/2W, 1%

R20	Resistor, 100K, 25W
R21	Resistor, 4.7M, ½W
R22	Resistor, 2M, 1W, 1%
R23	Resistor, 1M, 1W, 1%
R24	Resistor, 200K, 1W 1%
R25	Resistor, 100K, 1W 1%
R26,27	Resistor, 27K, 1/2W, 10%
R28	Resistor, 47K, 1/2W
S1	Switch, toggle, DPST, C-H 7561K4
S2	Switch, Rotary, SP7T, CRL PA 300/PA-0
S3	Switch, Toggle, Momentary, Mossman 703Z1P1
S5	Switch, Rotary, DP8T, PA300/PA-0/PA-1
S4	Switch, Toggle, Momentary Mossman 703Z2P1
T1	Transformer, Stancor 8415
T2	Transformer, Hipotronics #CV1598
V1	Tube, 12AU7, 10M Series, Mullard
SCH	Part No., 1669 D
Rev "B"	Incorp. EC 37-0221
	Change C4 from .25uf @ 660V to .25 uf @ 1KV
	Change C5 from .5uf @ 1500V to .5uf @ 2KV
	Change R3 from 51K to 47K
	Change T1 from Stancor PS8415 to Lampco LM-325
Rev "C"	Incorp. EC 37-0265
Rev "D"	Change T1 from Lampco LM325 to Stancor 8415

RETURNED MATERIAL

IF, FOR ANY REASON, IT SHOULD BECOME NECESSARY TO RETURN THIS EQUIPMENT TO THE FACTORY, THE WARRANTY SERVICE DEPARTMENT OF HIPOTRONICS' MUST BE CONTACTED, AT WHICH TIME THE FOLLOWING DATA MUST BE GIVEN IN ORDER THAT WE MAY IDENTIFY THE UNIT AND DETERMINE THE NECESSITY FOR RETURN.

NAME PLATE INFORMATION:
MODEL NUMBER:
SERIAL NUMBER:
REASON FOR RETURN:
DEFECT:
ALLEGED CAUSE OF DEFECT:

IF HIPOTRONICS DEEMS RETURN OF THE PART APPROPRIATE, IT WILL THEN ISSUE AN "AUTHORIZATION FOR RETURN" TAG, WHICH WILL INSTRUCT YOU AS TO THE METHOD OF RETURN. THE PINK COPY SHALL BE FOR YOUR RECORDS, THE HARD COPY TO BE AFFIXED TO THE UNIT BEING RETURNED. IF RETURN IS NOT DEEMED ADVISABLE, OTHER INSPECTION ARRANGEMENTS WILL BE MADE.

NOTE:

MATERIAL RECEIVED AT THIS PLANT WITHOUT THE PROPER AUTHORIZATION SHALL BE HELD AS "CUSTOMERS PROPERTY' WITH NO SERVICE UNTIL SUCH TIME AS THE PROPER STEPS HAVE BEEN TAKEN.

YOUR COOPERATION IS REQUESTED IN ORDER TO INSURE PROMPT SERVICE.
THANK YOU.

Exhibit A
SOP # 652

WARRANTY

HIPOTRONICS, INC. warrants to the original purchaser of any new merchandise that the merchandise is free from defects in material and workmanship under normal use and service for a period of one (1) year from the date of shipment. The obligation of Hipotronics, Inc. under this Warranty is limited, in its exclusive option, to repair, replace or issue credit for parts or materials which prove to be defective, and is subject to Purchaser's compliance with the Hipotronics, Inc. Warranty Claim Procedure as set forth below. The happening of any one or more of the following events will serve to void this Warranty and any defect or damage resulting therefrom is specifically excluded from Warranty coverage: (a) defects due to accident, negligence, alteration, modification, faulty installation by Purchaser or Purchaser's agents or employees, abuse or misuse; (b) attempted or actual dismantling, disassembling, service or repair by any person, firm or corporation not specifically authorized in writing by Hipotronics, Inc. (c) defects caused by or due to handling by carrier, or incurred during shipment, transshipment or other move.

This Warranty covers only those parts and/or materials deemed by Hipotronics, Inc. to be defective within the meaning of this Warranty. The liability of Hipotronics, Inc. shall be limited to the repair, replacement or issuance of credit for parts deemed defective within the meaning of this Warranty. Costs incurred by purchaser for labor or other expenses incidental to the inspection, repair, replacement or issuance of credit for such parts and/or material shall be the sole responsibility of purchaser. This Warranty shall not apply to any accessories, parts, or materials not manufactured or supplied by Hipotronics, Inc. and if, in the sole discretion of Hipotronics, Inc., Purchaser's claim relates to any materials or workmanship manufactured or performed by the supplier of a component part, or of the manufacturer of a device of which the defective part is a component, Hipotronics, Inc. reserves the right to disclaim liability under this Warranty and to direct that the Purchaser deal directly with such supplier or manufacturer. Hipotronics, Inc. agrees to assist the Purchaser in processing or settling any such claim without prejudicing its position as to liability.

WARRANTY CLAIM PROCEDURE Compliance with the following Warranty Claim Procedure is a condition precedent to the obligation of Hipotronics, Inc. under this Warranty:

(a) Purchaser must notify Hipotronics, Inc. in writing by certified or registered mail, of the defect claimed within twelve (12) months after date of original shipment. Said notice shall describe in detail the defect, the defective part, and the alleged cause of defect; (b) at the exclusive option of Hipotronics, Inc., Purchaser shall dismantle or disassemble at Purchaser's cost and expense and shall ship the defective part or material prepaid to Hipotronics, Inc., Brewster, New York 10509, for inspection, or permit an authorized service representative of Hipotronics, Inc. to inspect the defective part or material at Purchaser's premises. If Hipotronics, Inc. shall inspect the part or ma-

WARRANTY CLAIM PROCEDURE (cont'd)

terial at the Purchaser's premises, Purchaser shall provide facilities for, and at Purchaser's cost and expense, dismantle, disassemble, or otherwise make accessible the subject part or material whether or not same is a component of or installed in a device other than that manufactured or supplied by Hipotronics, Inc. If disclosure shows that the defect is not one for which Hipotronics, Inc. is liable, the Purchaser agrees to reimburse Hipotronics, Inc. for all expense incurred; (c) upon receipt of the defective part or material, or after access to same, Hipotronics, Inc. shall inspect the part or material to determine the validity of Purchaser's Claim.

The validity of any Warranty Claim, Purchaser's compliance with Hipotronics, Inc. Warranty Claim Procedure, the obligation to either repair, replace, or issue credit, or direct the Purchaser to deal directly with a manufacturer or supplier are to be determined solely and exclusively by Hipotronics, Inc. and any determination so made shall be final and binding.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED ON THE PART OF HIPOTRONICS, INC., INCLUDING THE WARRANTIES OF MERCHANTIBILITY AND FITNESS FOR USE, AND CONSEQUENTIAL DAMAGES ARISING FROM ANY BREACH THEREOF AND HIPOTRONICS, INC. NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON, FIRM OR CORPORATION TO ASSUME ANY LIABILITY OR OBLIGATION IN CONNECTION WITH THIS SALE ON ITS BEHALF AND PURCHASER ACKNOWLEDGES THAT NO REPRESENTATIONS EXCEPT THOSE MADE HEREIN HAVE BEEN MADE TO PURCHASER.

9/17/71

MP MASTER
MA35489